with some simple mechanical contrivances such as the wedge, screw, lever, and pulley; another on simple harmonic motion, in which the pendulum is rather fully dealt with; and then follows a chapter devoted to the mechanics of fluids, and comprising an examination of the stability of floating bodies. The book concludes with a chapter on units and dimensions.

Sets of examples are given, the numerical answers being collected at the end of the volume. Specimens of recent intermediate science examination papers of University College in connection with the University of London are appended. Some will regret that the author does not assume a slight acquaintance with the Calculus such as must be possessed by most readers of the book. But taken altogether the subject is dealt with very thoroughly, and developed naturally and logically, and the book deserves a wide circulation.

MUSIC OF SINGING-BIRDS.

Field Book of Wild Birds and their Music. By F. Schuyler Mathews. Pp. xxxv+262. (New York and London: G. P. Putnam's Sons, 1904.) Price 2 dollars.

THIS is a very pretty little book, with many charming illustrations of American singing-birds, and numerous attempts to represent their songs in our musical notation. It would seem as if the songs of American birds lent themselves more readily than those of our European species to such notation, for this is by no means the first attempt of this kind which has recently been made on the other side of the water. The present reviewer is under the disadvantage of not having heard these birds in their native land, and is quite ready to believe that Mr. Mathews's musical notations may give an American some vague idea of what his birds sing; at the same time, as one whose knowledge of music is even older than his knowledge of birds, he must emphatically express a hope that British ornithologists will not imitate their American brethren in trying to render our familiar songs on this system. Our music is a highly artificial product, subject to strict limitations which have gradually been placed upon it as the art has developed in the course of many centuries; and to attempt to catch and (so to speak) to tame the songs of wild birds, bringing them forcibly under conditions which entirely deprive them of their natural freedom in regard to pitch, scale, time, and rhythm, is in almost all cases to do them cruel violence. A very few of our birds—the cuckoo, for example, and the song-thrush—have vocal utterances which can be expressed on our musical scale; but by far the greater number can only be represented in the amusing way in which Mr. Mathews has noted the song of the bobolink on pp. 50 and 51—by a cloudy jumble of notes and lines above the stave, which suggests a flute-player gone mad.

The sentence which he has prefixed to this curious bit of notation really explains his object and method, and forbids us to take him too scientifically. He says, "If one prefers not to *interpret* bird-music, but to take it from Nature exactly as it comes, this bit that follows may prove acceptable." What he has really been trying to do, it seems, is to *interpret* bird-music, by which he means that he has listened to it with a musical mind, and has gained from it certain musical impressions, which he again interprets to us in the language of our musical art, not only in the form of melody confined in the fetters of our musical scale, but in many cases enriched with ingenious accompanying harmonies. The reader will find a good illustration of this method in the treatment of the song of the American song-sparrow, pp. 110 foll. It is the method pursued by all who seriously attempt to transfer the notes of birds to music-paper, though it may be doubted whether they would all acknowledge this as frankly as Mr. Mathews. It follows that our knowledge of bird-music is not really increased by these efforts, charming and interesting as they often are to the musician; for what is put upon paper is not the song of the bird, but an interpretation of it by an artistic mind. Taken in this light, this little book may give much pleasure, and may add a good deal to our knowledge of some delightful American songsters.

W. W. F.

OUR BOOK SHELF.

Studien ueber Hautelektricität und Hautmagnetismus des Menschen. By Dr. Erik Harnack. Pp. 65. (Jena: Gustav Fischer, 1905.) Price 1.60 marks.

THE author takes a pocket-compass, about the size of a lady's watch, with metal case and watch-glass top, and having placed it on a level surface lightly rubs the glass with the tip of his finger. The needle is immediately deflected from the magnetic meridian, remaining so for a minute or more, and then returning to its original position. That magnetism has nothing to do with it is shown by the fact that the same phenomenon occurs when for the magnet there is substituted a needle of nickel, platinum, zinc, bismuth, or ivory, although the absence in such cases of a directive force makes it more difficult to observe. Static charges, apparently much stronger, are without effect. Some people can influence the needle much more than others, and the author's power is not always equally strong.

Quantitative experiments were undertaken by the author to measure the E.M.F. induced by rubbing a glass plate of the same size and shape in the same manner. Using a Braun electrometer graduated up to 1500 volts, the maximum value obtained by him was 1300 volts. It seems evident that a strong electric charge is developed on a part of the glass surface by the friction of the finger upon it, and that the needle being free to move, and, moreover, in metallic connection with the case, is attracted by the charged surface.

This is not disputed by the author, his contention being that the magnitude of the effect is out of all proportion to the force expended, and that, therefore, it is not due to physical but to physiological causes set in action by the slight friction of the finger-tips. In the present writer's opinion this contention is certainly not substantiated. The total energy of the charge of a condenser composed of a compass-needle and a square centimetre or so of glass with a P.D. of a thousand or, for that matter, of ten thousand volts is trifling, and since the work actually done consists in the mere turning of the needle through 90°, one is driven to ask whether if a cocoon fibre were attached to the end of the needle and to the

operator's finger he would be able to feel the pull of the earth's magnetic force upon it. The work done by a few light touches of the finger must be amply sufficient to furnish all the energy required to deflect the needle. But to a modern electrician it certainly seems a remarkably efficient transformation.

GEORGE J. BURCH.

An Introduction to the Study of Colour Phenomena. By Joseph W. Lovibond. Pp. 48; 10 coloured plates. (London: E. and F. N. Spon, Ltd.; New York: Spon and Chamberlain, 1905.) Price 5*s.* net.

THE author states that his object has been to supply the long-felt want of a power of recovering a given colour sensation and of a colour nomenclature by which that sensation may be quantitatively described. To this end "scales of red, yellow and blue were constructed of glass slips, the slips of each scale being all of one colour with a regular variation in intensity from 0.01 to 20 units, equal units of the three scales being in colour equivalence with each other. . . . The test of equivalence is that a white light viewed through equal units of the three scales should give no evidence of colour. . . . The fogs on Salisbury Plain furnished the light actually used." It was found that red, yellow, and blue were the only colours suitable for systematic work, and that any colour could be produced by their combination. The dimensions of the unit are, it is said, necessarily arbitrary, but the scale-divisions are equal, while the unit itself is recoverable.

The colour to be tested is matched by that of the light transmitted by one of the glasses, or by several superposed, equality of luminosity being secured, when necessary, by the interposition of a neutral-tinted combination between the eye and the coloured object. A specification of the glasses employed is registered, according to certain rules, as a formula which defines in terms of the author's constants the colour "developed," and supplies data for its future reproduction.

To those who are accustomed to regard the spectrum as the natural basis of colour experiment the author's method cannot but appear crude and unscientific; but, given a sufficient supply of carefully selected glasses, it is probable that much useful work might be done in a rough and ready way by its means. An example occurs in the quantitative study of the colour of the human blood in health and in disease, which is illustrated in plate vi.

The book concludes with an exposition of Mr. Lovibond's new theory of colour.

Index Phytochemicus. By Drs. J. C. Ritsema and J. Sack. With introduction by Dr. M. Greshoff. Pp. 86. (Amsterdam: J. H. de Bussy.)

DR. GRESHOFF explains in the introduction to this volume that it originated in a card index to the literature of plant chemistry compiled for use in the laboratory of the Colonial Museum at Haarlem, where the work carried on consists principally of the investigation of the proximate constituents of plants.

The index enumerates the names of more than two thousand plant constituents, and gives in each case the percentage composition, formula, melting or boiling point, and at least one reference to the literature—usually Beilstein's "Handbuch," though in a few cases the references are to original papers. The volume also contains a short but useful bibliography of plant chemistry.

The information given in the tables, so far as can be judged from trials in a few cases, appears to be accurate, and the index should prove useful to chemists engaged in the investigation of plant products.

LETTERS TO THE EDITOR.

[The Editor does not hold himself responsible for opinions expressed by his correspondents. Neither can he undertake to return, or to correspond with the writers of, rejected manuscripts intended for this or any other part of NATURE. *No notice is taken of anonymous communications.]*

Eclipse Predictions.

IT is always interesting to compare the results of observation with those predicted by calculation. In the case of the recent total eclipse of the sun this is rendered difficult by the want of agreement in the predictions of the two most used authorities, the Nautical Almanac and the Connaissance des Temps. The discrepancies in the predicted duration of totality and of the breadth of the band traced on the earth's surface by the total phase are made apparent in the following table. It is compiled from the table in the Nautical Almanac headed "Limits of total phase of the Solar Eclipse," and the corresponding table in the Connaissance des Temps entitled "Limites de l'Éclipse totale et Durée de la Phase totale sur la Ligne centrale." Entries for as nearly as possible the same time in each table have been taken and are placed together:—

Column A contains the authority, Nautical Almanac (N.A.) or Connaissance des Temps (C.T.).

Column B contains the time (G.M.T.) for which each prediction is made.

Column C contains the calculated distance (in nautical miles) and the bearing of the northern limit of totality from the corresponding southern limit.

Column D contains the durations of totality on the central line as predicted by the one authority and (in brackets) as interpolated from the prediction of the other.

Column E contains the differences of these pairs of values.

A	B 1905 Aug. 30 G.M.T.	C Distance	C Bearing	D N.A.	D C.T.	E
	h. m.	′	°	secs.	secs.	secs.
C.T.	0 22	113·5	N. 1 W.	(198·4)	206	7·4
N.A.	0 24	101·5	,, 2 W.	200·6	(208)	7·6
C.T.	0 35·2	109·5	,, 2 E.	(211)	219	8·0
N.A.	0 36	102	,, 11 ,,	211·8	(219·5)	7·7
C.T.	0 50·3	114	,, 6 ,,	(220·2)	228	7·8
N.A.	0 48	104	,, 19 ,,	219·1	(227·4)	8·3
C.T.	1 7·0	116·5	,, 10 ,,	(223·8)	231	7·2
N.A.	1 8·0	104	,, 31 ,,	223·8	(231·2)	7·4
N.A.	1 24	105·5	,, 37 ,,	22·7	(226·6)	5·9
C.T.	1 24·9	116·5	,, 12 ,,	(220·2)	227	6·8
C.T.	1 43·1	115	,, 14 ,,	(209·2)	215	5·8
N.A.	1 44	106	,, 44 ,,	208·4	(214)	5·6

It will be seen that, for stations in Spain and the adjacent Mediterranean, the duration of totality on the central line was predicted by the French authority to be from seven to eight seconds longer than by the British authority. In the same region, the width of the band of totality is from ten to eleven nautical miles greater by the French than by the British prediction. The orientation of the line connecting the two limits of totality also differs considerably in the two tables.

It is reported that at Sousse and Gabes, two towns in Tunisia, the eclipse was partial, while a total eclipse had been predicted for them. The prediction for these places would surely rest on French authority: we are therefore entitled to conclude that the mistake has been made by the French calculators. An excessive estimate of the width of the band of totality would almost certainly be accompanied by an excessive estimate of the duration of totality, and the table shows that both estimates are considerably greater in the Connaissance des Temps than in the Nautical Almanac.

J. Y. BUCHANAN.

October 13.

Absence of Vibration in a Turbine Steamship.

RETURNING homeward to Paris the middle of September from the Tripoli eclipse, and finding passage to America difficult to obtain, I chanced to learn that the triple-screw turbine steamer R.M.S. *Virginian* was sailing from Liverpool for Montreal on September 30, so I was very glad to have the opportunity of a voyage in a ship full powered with this novel type of propulsion. After a week on board I have no hesitation in saying that for freedom from